

generating an alarm; and

activating an alarm; and

a user interface operably linked to said processor.

REMARKS

This is in reply to the Examiner's Official Action dated March 13, 2003. Claims 1-41 are currently pending. By this response, Applicant has amended the specification to correct minor typographical errors. Claims 1, 20, 28, 34, 38 and 41 have been amended, and claims 42 and 43 have been added to more appropriately claim the invention. The above amendment with the following remarks is submitted to be fully responsive to the Official Action. Reconsideration of this application in light of these remarks, and allowance of this application are respectfully requested.

I. Information Disclosure Statement

In the response, the Examiner stated that:

the listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, 'the list may not be incorporated into the specification but must be submitted in a separate paper.' Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered."

(March 13, 2003 Official Action at page 2.)

Applicant acknowledges the duty to disclose to the Patent and Trademark Office (PTO) all information known to be material to the patentability of the present invention.

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Applicant is also aware of the requirement to cite material documents on a PTO Form 1449. When Applicant prepared and filed the parent of the present application (09/742,540), on December 22, 2000, he filed an Information Disclosure Statement (IDS), citing the references listed in the specification. The stamped transmittal with the associated 1449 is attached to this response. According to the MPEP § 609 (I)(A)(2):

The examiner will consider information which has been considered by the Office in a parent application when examining. . . (C) a continuation-in-part application filed under 37 CFR 1.43(b). Such information need not be resubmitted unless applicant desires the information to be printed on the patent.

This application is a continuation-in-part to the '540 application. Copies of all of the references are filed in the original application file and are available to the Examiner in that file. If the Examiner needs additional copies of the previously-filed references, or if there are additional references that were not listed in the previously-filed 1449, please advise. Otherwise, Applicant respectfully requests that the Examiner consider the documents contained in the December 22, 2000 IDS, indicate that they were considered by making appropriate notations on the PTO form 1449 included with the references, and return the initialed Form 1449 to Applicant's representative.

II. Rejection of Claims 1-41 Under 35 U.S.C. § 112

On page 5 of the Official Action, the Examiner rejected claims 1-41 under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in such a way as to enable one of skill in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. For the reasons stated

below, Applicant respectfully traverses the rejection of claims 1-41 under 35 U.S.C.

§112, first paragraph. According to the Examiner:

[n]owhere in the specification is there any discussion of exactly how the processing equipment determines the proximity of an object relative to the location of an aircraft. In fact, no aircraft appears anywhere in the drawings.

(March 13, 2003 Official Action at page 5.)

The Examiner also writes that:

[t]he specification is replete with a myriad of physical setups in which transmitters and transceivers and their associated receivers and reflectors are situated, and the Examiner recognizes that signals are certainly sent from these optical apparatus to the processing equipment. However, what exactly is done with these signals remains a mystery. How does the object characterizer determine what type of object is present (i.e., is the system time-based? Velocity-based? Are there certain physical parameters the detected object must meet in order to merit an alarm? If so, what are they? What parameters correspond to what type of alarm?) What exactly does the operation sensor detection system and output inspector diagnostic system do? How is the height of the optical sensor system changed? Merely showing two different positions in the drawing package is not enough.

(Id. at page 6.) (emphasis in original)

The determination of the proximity of an object relative to the location of an aircraft, the identification of the object and other comparisons and evaluations mentioned in the specification are operations that may be carried out by one or more appropriately programmed standard commercially available computers. The nature of the program will be readily evident from the function described, is within the capability of persons of ordinary skill in the art, and, therefore, need not be explained more fully

beyond the comments made in the specification. The subject matter of the present application is a system and method and not computer software. Moreover, Applicant does not intend to limit the present invention to any particular signal processing system, method, or software platform.

The Examiner recognizes that the specification contains several configurations of transmitters, transceivers, receivers and reflectors, and that signals are sent from these optical apparatus to processing equipment. (March 13, 2003, Official Action at pages 5-6.) Since the process of determining an object's size, shape, configuration, movement direction, etc., is well-known to one of skill in the art (see e.g., U.S. Patent No. 4,319,332 to Mehnert at col. 8, lines 15-29), the algorithms for determining the type of object present and algorithms for determining whether a detected object merits an alarm is not necessary to enable one of skill in the art to make and/or use the invention.

The Examiner additionally questions the operation of the operation sensor detection system and output inspector diagnostic system. (March 13, 2003 Official Action at page 6.) According to the specification:

the system includes operation sensors and output inspector apparatus for sensing impaired operation of the optical laser system or other debris sensing apparatus and for modifying the operation of the system in accordance therewith. In accordance with a preferred embodiment of the present invention, the apparatus for sensing and modifying includes apparatus for operating the optical laser transmitting and receiving apparatus in an occupancy probability sensing mode of operation.

(Applicant's Specification at page 10, paragraph 35.)

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Applicant contends that systems and methods for sensing impaired operation of an optical laser system, modifying its operation and operating an optical laser system in an occupancy probability sensing mode of operation are also well-known to one of skill in the art (see e.g., U.S. Patent No. 5,471,214 to Faibish *et al.* (hereinafter, *Faibish*) at col. 2, lines 53-57). More specifically, *Faibish* discusses methods for sensing impaired operation of an optical laser system and modifying its operation at col. 3, lines 49-52 and at col. 11, lines 9-30. *Faibish* also discloses an occupancy probability sensing mode at col. 10, line 40 - col. 11, line 30. Since those concepts are disclosed in the prior art, they need not be explained here to enable the present invention.

In further response to the Examiner's inquiry, Applicant contends that methods and systems for changing the height of the optical sensor system are so notoriously well-known that merely showing two different positions in the drawing package is enough to enable that feature of the present invention. According to the M.P.E.P. § 2164.01, "[a] patent need not teach, and preferably omits what is well-known in the art." Therefore, it is clear that one of skill in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. Since the scope of the claims is adequately enabled by the specification and prior art, the rejection of claims 1-41 under 35 U.S.C. §112, first paragraph should be withdrawn.

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III. Rejection of Claims 1-9, 11-15, 19-24, 27-30 and 33-41 Under 35 U.S.C. §103(a)

On page 6, the Examiner rejected claims 1-9, 11-15, 19-24, 27-30 and 33-41 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,319,332 to Mehnert (hereinafter, *Mehnert*). According to the Examiner, *Mehnert* includes all of the elements of claim 1, but it does not specifically state a user interface. The Examiner however provides that “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to include a user interface.” (March 13, 2003 Official Action at page 7.

The present invention as recited in independent claims 1, 20, 28, 34, 35, 38 and 41 is directed to a method and system comprising *inter alia*, an optical system comprising at least one transmitter located at a first location and at least one receiver corresponding to the transmitter, located at a second location.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be some reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure.

In the Official Action, the Examiner states that "[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to include a user interface as such interfaces have been used for some time in alarm and alerting apparatus." *Id.* at 7. This statement identifies no suggestion or motivation within the reference. *Mehnert* fails to disclose any suggestion or motivation to combine it in the manner the Examiner suggests. Even if the claimed invention is within the capabilities of one of ordinary skill in the art, this alone, is not sufficient to establish *prima facie* obviousness. See M.P.E.P. § 2143.01. Consequently, the rejection does not meet this prong of the obviousness test.

In addition to the lack of motivation or suggestion to combine, there is no reasonable expectation of success that combining *Mehnert* with a user interface will yield a reasonable probability of success. The Examiner has provided no evidence to the contrary. The obviousness rejection should fail for this reason as well.

Even if there were a motivation to combine reference teachings and some reasonable expectation of success, *Mehnert* fails to teach or suggest all the claim elements. Specifically, the Examiner does not argue, nor does *Mehnert* teach, suggest or disclose an optical system comprising at least one transmitter located at a first location and at least one receiver corresponding to the transmitter, located at a second location, as recited in independent claims 1, 20, 28, 34, 35, 38 and 41. In fact, *Mehnert* teaches away from the use of a transmitter at a first location and at least one receiver at a second location when it provides that the transmitter and the receiver are located at

the same location. (See e.g., col. 5, lines 1-11; and FIGs. 2-8 and 11.) Therefore, the rejection of independent claims 1, 20, 28, 34, 35, 38 and 41 under § 103(a) as unpatentable over *Mehnert* is improper and should be withdrawn. The rejection of dependent claims 2-9, 11-15, 19, 21-24, 27, 29, 30, 33, 36, 37, 39 and 40 should also be withdrawn as they depend on allowable subject matter as recited in the respective independent claims from which they directly or indirectly depend. New claims 42 and 43 are also allowable for the same reason that claims 1, 20, 28, 34, 35, 38 and 41 are allowable.

The Examiner next rejected claims 16, 17, 25 and 31 under 35 U.S.C. § 103(a) as unpatentable over *Mehnert* as applied to claims 1, 20 and 28 above, and further in view of U.S. Patent No. 5,554,972 to Byrne (hereinafter, *Byrne*). The Examiner admits that *Mehnert* does not teach the capability to adjust the height of the support mechanism and he cites *Byrne* for allegedly teaching this feature. *Byrne* does not teach, suggest or disclose an optical system comprising at least one transmitter located at a first location and at least one receiver corresponding to the transmitter, located at a second location, as recited in independent claims 1, 20 and 28. Therefore, *Byrne* does not make up for the shortcomings of *Mehnert*. Claims 16, 17, 25 and 31 depend directly or indirectly from claims 1, 20 and 28. Consequently, claims 16, 17, 25 and 31 are not unpatentable under § 103(a) over *Mehnert*, in view of *Byrne*.

The Examiner next rejected claims 18, 26 and 32 under 35 U.S.C. § 103(a) as unpatentable over *Mehnert* as applied to claims 1, 20 and 28 above, and further in view

of U.S. Patent No. 6,295,007 to O'Meara (hereinafter, *O'Meara*). The Examiner admits that *Mehnert* does not teach the capability to heat the support mechanism and he cites *O'Meara* for allegedly teaching this feature. *O'Meara* does not teach, suggest or disclose an optical system comprising at least one transmitter located at a first location and at least one receiver corresponding to the transmitter, located at a second location, as recited in independent claims 1, 20 and 28. Therefore, *O'Meara* does not make up for the shortcomings of *Mehnert*. Claims 18, 26 and 32 depend directly or indirectly from claims 1, 20 and 28. Consequently, claims 18, 26 and 32 are not unpatentable under § 103(a) over *Mehnert*, in view of *O'Meara*.

In view of the foregoing, it is submitted that the cited prior art considered separately or in combination fails to teach or suggest the Applicant's invention. Therefore, it is respectfully asserted that the present application is in condition for allowance and a notice to that effect is respectfully requested. However, if the Examiner deems that any issue remains after considering this response, he is invited to call the undersigned to expedite the prosecution and work out any such issue by telephone.

Attached hereto is a marked-up version of the changes made to the claims by this amendment. The attached page is captioned "**Version with markings to show changes made.**" Deletions appear as normal text surrounded by [] and additions appear as underlined text.

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If there is any fee due in connection with the filing of this Amendment, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

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Dated: May 29, 2003

By: 
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Application No.: 09/988,376
Attorney Docket No. 09179-0001

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Please amend the paragraph 6 to read as follows:

Consequently, due to recent aviation catastrophes or near disasters that are attributable to objects or other debris on the airport runway surface when the aircraft are either taking off or landing, there is a need to develop [and] an apparatus and system to locate, characterize, and alert appropriate airport personnel to the presence of objects or other debris on airport runways.

Please amend the paragraph 15 to read as follows:

An object of the present invention is to provide a novel apparatus and method that may direct one or more laser beams across an airport runway surface that may contain objects or other debris. As a result of the novel apparatus, the invention can provide a sufficient period of time for the aircraft, air traffic control, and/or ground based personnel to take corrective action to avoid the hazardous conditions.

Please amend the paragraph 29 to read as follows:

In accordance with a preferred embodiment of the present invention, at least one of the optical laser transmission and receiving apparatus and the multiple objects or other debris optical laser apparatus includes a motion processor apparatus for distinguishing moving objects or other debris from stationary objects or other debris.

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Please amend the paragraph 31 to read as follows:

Additionally, in accordance with a preferred embodiment of the present invention, the object characterizer apparatus includes apparatus for disregarding objects [or objects] or other debris whose vectors do not fit within a predetermined profile.

Please amend the paragraph 35 to read as follows:

Further in accordance with a preferred embodiment of the present [present] invention, the system also includes operation sensors and output inspector apparatus for sensing impaired operation of the optical laser system or other debris sensing apparatus and for modifying the operation of the system in accordance therewith. In accordance with a preferred embodiment of the present invention, the apparatus for sensing and modifying includes apparatus for operating the optical laser transmitting and receiving apparatus in an occupancy probability sensing mode of operation.

Please amend the paragraph 51 to read as follows:

FIG. 2 illustrates a [3-dimentional] 3-dimensional frontal view of the airport runway surface with optical laser embodiments present.

Please amend the paragraph 52 to read as follows:

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FIG. 3 is [3-dimensionally presented as] a 3-dimensional side view of the airport runway surface with optical laser embodiments present around the [parameter] perimeter.

Please amend the paragraph 57 to read as follows:

FIG. 6 is a top view of the airport runway surface with optical laser embodiments present on both sides and on each end showing a laser beam configuration covering the length and width of area specified in three different directions constantly traveling through several different planes.

Please amend the paragraph 58 to read as follows:

FIG. 6A is a simplified top view of the airport runway surface illustrating where an optical laser would provide protection for aircraft in landing and take off sections of the airport runway surface.

Please amend the paragraph 59 to read as follows:

FIG. 7 illustrates a top view of the entire airport runway surface with optical laser embodiments present on both sides showing a laser beam configuration covering the width of area specified in both directions constantly traveling through several different planes.

Please amend the paragraph 61 to read as follows:

FIG. 8 is a front view of a convex airport runway surface with optical laser embodiments present on both sides showing a laser beam configuration covering the width of the area specified in one direction from left to right constantly traveling through several different planes.

Please amend the paragraph 62 to read as follows:

FIG. 9 is a front view of a convex airport runway surface with optical laser embodiments present on both sides showing a laser beam configuration covering the width of the area specified in both directions constantly traveling through several different planes.

Please amend the paragraph 63 to read as follows:

FIG. 10 is a top view of the entire airport runway surface with optical laser embodiments present on all sides showing the laser beam configuration covering both width and length of the area specified. Laser [beam] beams are, in four different constant directions, two of which are sweeping both left and right traveling through several different planes.

Please amend the paragraph 65 to read as follows:

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FIG. 12 is a top view of the airport runway surface with optical laser embodiments present at both ends of landing and take off portions of airport runway surface showing a laser beam configuration covering in a constant direction both width and length of the area specified. Laser [beam] beams are in four different constant directions, two of which are sweeping both left and right traveling through several different planes.

Please amend the paragraph 66 to read as follows:

FIG. 12A is a simplified top view of the airport runway surface illustrating where optical [laser] lasers would provide protection for aircraft in landing and take off sections of the airport runway surface.

Please amend the paragraph 67 to read as follows:

FIG. 13 is a top view of the airport runway surface with optical laser embodiments present along parameter showing a laser beam configuration covering length and width of the area specified in four different constant directions, two of which are sweeping both left and right traveling through several different planes.

Please amend the paragraph 68 to read as follows:

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FIG. 13A is a simplified top view of the airport runway surface illustrating where an optical laser would provide protection for aircraft in landing and take off sections of the airport runway surface.

Please amend the paragraph 69 to read as follows:

FIG. 14 is a top view of the airport runway surface with optical laser embodiments present on one side showing a laser beam configuration covering the width of area specified in two constant directions traveling through several different planes.

Please amend the paragraph 71 to read as follows:

FIG. 15 is a top view of the airport runway surface with optical laser embodiments present on both sides showing a laser beam configuration covering the width of the area specified in three constant directions traveling through several different planes.

Please amend the paragraph 79 to read as follows:

FIG. 19 is a top view of the airport runway surface with optical laser embodiments present at both ends of the airport runway surface showing laser beam configuration covering the length and width of a specified area from three different directions constantly traveling through several different planes.

Please amend the paragraph 80 to read as follows:

FIG. 19A is a simplified top view of the airport runway surface illustrating where an optical laser would provide protection for aircraft in landing and take off sections of the airport runway surface.

Please amend the paragraph 84 to read as follows:

[/]FIG. 22 is a front view of a convex airport runway surface with optical laser embodiments present on both sides showing laser beam configuration covering the width of the area specified in one direction constantly traveling through several different planes from left to right.

Please amend the paragraph 87 to read as follows:

FIG. 25 is a front view of a convex airport runway surface, specifically showing a sectional view of the support for holding the optical laser embodiment located at the width of the airport runway surface. Illustrating that the inner core would maintain a constant temperature during inclement weather to prevent the freezing of all embodiments.

Please amend the paragraph 88 to read as follows:

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FIG. 26 is a front view of a convex airport runway surface, specifically showing the movement of raising and lowering the entire support for holding the optical laser embodiment located at the width of the airport runway surface. [Illustrating the above and below ground location of embodiments in order to prevent obstacles during the removal of snow and ice from the airport runway surface.]

Please amend the paragraph 92 to read as follows:

FIG. 29 is a top view of the airport runway surface with optical laser [embodiment] embodiments present on both sides of the width showing a laser beam configuration covering width of area specified in two directions constantly traveling through several different planes.

Please amend the paragraph 94 to read as follows:

FIG. 30 is a top view of the airport runway surface with optical laser [embodiment] embodiments present on both sides of the width showing a laser beam configuration covering length and width of area specified in one direction constantly traveling through several different planes.

Please amend the paragraph 96 to read as follows:

FIG. 31 is a top view of the airport runway surface with optical laser [embodiment] embodiments present on both sides of the width showing a laser beam

configuration covering length and width of area specified in two directions constantly traveling through several different planes.

Please amend the paragraph 114 to read as follows:

An alternative preferred embodiment of the present invention is a method for detecting objects on an airport runway comprising detecting the presence of an object on the airport runway 3 by the object's interruption of one or more optical laser beams 4 generated by an optical system 10, processing the output from the optical system 10 to determine the location of the object on the runway 3, and transmitting the information regarding the object to appropriate personnel. The method may further comprise the step of processing the output from the optical system 10 to determine the type of object on the runway 3. The method may further comprise transmitting the information to a user inter-face to alert appropriate personnel. An alternative preferred embodiment of the above method comprises the steps of detecting the [present] presence of an object on an airport runway by the object's interruption of one or more optical laser beams generated by an optical system, processing the output from the optical system to determine the location of the object on the runway, processing the output from the optical system to determine the type of object on the runway, processing the output from the optical system to determine the appropriate degree of danger posed by the presence of the object on the runway, and transmitting the information regarding the object to a user interface.

Please amend the paragraph 116 to read as follows:

Reference is now made to FIG. 2 illustrating a [3-dimentional] 3-dimensional frontal view of the airport runway surface 3, with the center line 5 marking the width in an equal distance to both edges of the airport runway surface 3. The optical laser transmitter 1 which supplies the optical laser 4 to the optical laser receiver 2 is preferably located at the edge of the airport runway surface 3.

Please amend the paragraph 118 to read as follows:

FIG. 3 illustrates the side view of a [3-dimentional] 3-dimensional airport runway surface 3 with the center line 5 marking the width in an equal distance to both edges, [show optical laser embodiments,] both optical laser transmitter 1 and optical laser receiver 2 are located around the parameter.

Please amend the paragraph 125 to read as follows:

FIG. 8 is a front view of a convex airport runway surface 3 with optical laser transmitters 1 located on one side of the supporting mechanism 6, opposite of the optical laser receivers 2 located on the other side of the runway surface 3, also located on the supporting mechanism 6. The direction of the optical lasers 4 show the configuration covering the width of the area specified in one direction from left to right

while constantly traveling through several different planes, for example, but not limited to, within the range of .5 inches to 36 inches in height from the airport runway surface 3.

IN THE CLAIMS:

Please amend claims 1, 20, 28, 34, 38 and 41 as follows:

1. (Amended) An apparatus for detecting objects on an airport runway, comprising:

an optical system comprising at least one transmitter located at a first location and at least one receiver corresponding to the transmitter, located at a second location;

an object location processor operably linked to said optical system;
an object characterizer operably linked to said object location processor;
an alarm activation processor operably linked to said object characterizer;
an alarm generator operably linked to said object characterizer; and
a user interface operably linked to said alarm generator.

20. (Amended) An apparatus for detecting objects on an airport runway comprising:

an optical system comprising at least one transmitter located at a first location and at least one receiver corresponding to the transmitter, located at a second location;

wherein said optical system further comprises one or more optical transmitters and one [ore] or more optical receivers; one or more optical transceivers and one or

more optical reflectors; or a combination of optical transmitters/optical receivers and optical transceivers/optical reflectors;

an object location processor operably linked to said optical system; an object characterizer operably linked to said object location processor; an alarm activation processor operably linked to said object characterizer; an alarm generator operably linked to said alarm activation processor; and a user interface operably linked to said alarm generator.

28. (Amended) An apparatus for detecting objects on an airport runway comprising: an optical system;

wherein said optical system further comprises

one or more optical transmitters located at a first location and one [ore] or more optical receivers located at a second location; or

[or] one or more optical transceivers located at a first location and one or more optical reflectors located at a second location;

or a combination of optical transmitters/optical receivers located at a first location and optical transceivers/optical located at a second location reflectors;

an object location processor operably linked to said optical system;

wherein said object location processor further comprises one or more selected from the group consisting of an intrusion sensor detection system, an operation sensor detection system, and an output inspector diagnostic system;

an object characterizer operably linked to said object location processor;
wherein said object characterizer further comprises a motion detection
processor;

an alarm activation processor operably linked to said object characterizer;
an alarm generator operably linked to said alarm activation processor; and a user
interface operably linked to said alarm generator.

34. (Amended) An apparatus for detecting objects located on an airport
runway surface comprising:

a) one or more optical laser transmitters located at a first location and one or
more optical laser receivers located at a second location;

b) one or more optical laser transceivers located at a first location and one or
more optical laser reflectors located at a second location; or

c) any combination of a) and b);

for sensing the presence of objects on an airport runway surface.

38. (Amended) A method for detecting objects on an airport runway
comprising:

a) detecting the presence of an object on an airport runway by the
object's interruption of one or more optical laser beams generated by an optical system
comprising at least one transmitter located at a first location and at least one receiver
corresponding to the transmitter, located at a second location;

b) processing the output from the optical system to determine the location of the object on the runway;

c) transmitting the information regarding the object to appropriate personnel.

41. (Amended) A method for detecting objects on an airport runway comprising:

a) detecting the presence of an object on an airport runway by the object's interruption of one or more optical laser beams generated by an optical system comprising at least one transmitter located at a first location and at least one receiver corresponding to the transmitter, located at a second location;

b) processing the output from the optical system to determine the location of the object on the runway,

c) processing the output from the optical system to determine the type of object on the runway;

d) processing the output from the optical system to determine the appropriate degree of danger posed by the presence of the object on the runway;

e) transmitting the information regarding the object to a user interface.